

## Predicting Shortage of Hospital Beds during COVID-19 Pandemic in United States

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**Abstract :** World-wide spread of coronavirus grows the concern about planning for the excess demand of hospital services in response to COVID-19 pandemic. The surge in the hospital services demand beyond the current capacity leads to shortage of ICU beds and ventilators in some parts of US. In this study, we forecast the required number of hospital beds and possible shortage of beds in US during COVID-19 pandemic to be used in the planning and hospitalization of new cases. In this paper, we used a data on COVID-19 deaths and patients' hospitalization besides the data on hospital capacities and utilization in US from publicly available sources and national government websites. we used a novel ensemble modelling of deep learning networks, based on stacking different linear and non-linear layers to predict the shortage in hospital beds. The results showed that our proposed approach can predict the excess hospital beds demand very well and this can be helpful in developing strategies and plans to mitigate this gap.

**Keywords :** COVID-19, deep learning, ensembled models, hospital capacity planning

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